CLAIMS

1. An internal combustion engine with a laser ignition device, comprising a Q-switched, pumped solid-state laser with a pulsed pumped light source, a solid laser crystal embedded in a resonator, a Q-switch for increasing the power density, at least one output mirror and a focusing device, by means of which the laser beam may be focused in a combustion chamber, characterized in that the pumped light source, resonator plus laser crystal, Q-switch, output mirror, focusing device and a cooling device for cooling the resonator are integrated in a single component which can be inserted into a spark-plug shaft.

2. An internal combustion engine, especially according to claim 1, characterized in that the pumped light source is formed by pump diodes.

3. An internal combustion engine, especially according to claim 1 or 2, characterized in that the Q-switch is provided with a passive configuration.

4. An internal combustion engine, especially according to one of the claims 1 to 3, characterized in that the focusing device comprises a single focusing lens.

5. An internal combustion engine, especially according to one of the claims 1 to 4, characterized in that the cooling device comprises at least two, preferably three different cooling systems.

6. An internal combustion engine, especially according to one of the claims 1 to 5, characterized in that the resonator comprises at least one Peltier cooling element for cooling the pump diodes.

7. An internal combustion engine, especially according to one of the claims 1 to 6, characterized in that the resonator comprises an inner first coolant circulation for cooling the laser crystal.

8. An internal combustion engine, especially according to claim 6 or 7, characterized in that the resonator comprises at least one outer second coolant circulation for dissipating the heat from the Peltier cooling element.

9. An internal combustion engine, especially according to one of the claims 1 to 8, characterized in that the laser crystal is enclosed by at least one preferably annular first cooling channel.

10. An internal combustion engine, especially according to one of the claims 2 to 9, characterized in that several pump diodes are arranged in a concentric manner about the laser crystal.

11. An internal combustion engine, especially according to claims 10, characterized in that at least three, preferably at least six pump diodes are arranged evenly about the laser crystal.

12. An internal combustion engine, especially according to one of the claims 1 to 11, characterized in that upon cold starting the pump diodes can be heated to operating temperature by the Peltier cooling element.

13. An internal combustion engine, especially according to one of the claims 2 to 12, characterized in that the pump diodes are connected in series.

14. A Q-switched, pumped solid state laser, especially for a laser ignition device of an internal combustion engine, comprising a pulsed pumped light source formed by pump diodes, a solid laser crystal embedded in a resonator, a Q-switch for increasing the power density, at least one output mirror and a focusing device, with a cooling device being provided comprising at least one Peltier cooling element for cooling the resonator, characterized in that the cooling device comprises at least two, preferably three different cooling systems, with Peltier cooling elements being associated with the first cooling system for cooling the pump diodes.

15. A solid state laser, especially according to claim 14, characterized in that the resonator comprises an inner coolant circulation associated with the second cooling system for cooling the laser crystal.

16. A solid state laser, especially according to claim 14 or 15, characterized in that the resonator comprises at least one outer coolant circulation associated with

the third coolant system for dissipating the heat from the Peltier cooling system.

17. A solid state laser, especially according to one of the claims 15 or 16, characterized in that the laser crystal is enclosed by at least one preferably annular first inner cooling channel of the inner coolant circulation.

18. A solid state laser, especially according to one of the claims 14 or 18, characterized in that several pump diodes are arranged in a concentric manner about the laser crystal.

19. A solid state laser, especially according to claim 18, characterized in that at least three, preferably at least six pump diodes are arranged evenly about the laser crystal.

20. A solid state laser, especially according to one of the claims 14 to 19, characterized in that the pump diodes are connected in series.

21. A solid state laser, especially according to one of the claims 14 to 20, characterized in that the pump diodes are enclosed by a heat dissipater which is preferably arranged in a concentric manner about the laser crystal, with the heat dissipater preferably consisting of copper.

22. A solid state laser, especially according to one of the claims 14 to 21, characterized in that the pump diodes are enclosed by at least a row of first outer cooling channels of the first coolant circulation arranged in the direction of the axis of the solid state laser, with the first outer cooling channels preferably being arranged in the heat dissipater.

23. A solid state laser, especially according to one of the claims 14 to 22, characterized in that the Peltier cooling elements are preferably arranged in a concentric manner relative to the axis outside about the pump diodes, with the heat dissipater preferably being arranged between the pump diodes and the Peltier cooling elements.

24. A solid state laser, especially according to one of the claims 14 to 23, characterized in that the Peltier cooling elements are enclosed by a heat exchanger of the third cooling system preferably arranged in a concentric manner relative to the axis of the solid state laser.

25. A solid state laser, especially according to claim 24, characterized in that the heat exchanger comprises at least one row of second cooling channels arranged in a substantially concentric manner about the same and in the direction of the axis of the solid state laser.

26. A solid state laser, especially according to one of the claims 14 to 25, characterized in that at least the inner coolant circulation is flowed through by a medium which is optically transparent for laser wavelength.

27. A solid state laser, especially according to one of the claims 14 to 26, characterized in that the outer coolant circulation is connected with the coolant circulation of an internal combustion engine.

28. A solid state laser, especially according to one of the claims 14 to 27, characterized in that upon cold starting the pump diodes can be heated to operating temperature by the Peltier cooling element.

29. A solid state laser, especially according to one of the claims 14 to 28, characterized in that the Q-switch is provided with a passive configuration.

30. A solid state laser, especially according to one of the claims 14 to 29, characterized in that the focusing device comprises a single focusing lens.

31. A solid state laser, especially according to one of the claims 14 to 30, characterized in that the pumped light source, resonator plus laser crystal, Q-switch, output mirror, focusing device and the cooling device for cooling the resonator are integrated in a single component which can be inserted into a spark-plug shaft.